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CULTURAL METHODS IN VERTEBRATE PEST MANAGEMENT

By Joe E. Brooks

Cultural methods in vertebrate pest management involve changing agricultural practices from those practiced presently to new ones that will evade or minimize crop damage. Interestingly, the methods used to reduce rodent infestations and crop damages are quite the opposite of many of those used to reduce bird damage to crops. In rodent control, the main idea is to reduce or eliminate areas that contain excess vegetation, such as weeds, grasses, and shrubs, as these serve as food and cover for rodents. In bird damage reduction, one may want to leave areas of natural vegetation so these will provide alternate food sources for the birds and divert them from the field crops. If both kinds of vertebrate pests are present, the pest management specialist may have to decide which is the more important strategy in light of which pests are the most damaging.

A. Rodent Damage Reduction

Clean farming practices can do much to discourage rodent infestations and make it easier to detect and deal with them when they do occur. Around farm buildings, which often present many natural attractions to commensal and field rodents, it is particularly important to eliminate the rodent cover provided by the accumulations that tend to build up of discarded equipment, log piles, rubbish of various kinds and dense vegetation growing in neglected corners. Weeds and grasses should be kept cleared away from farm buildings for a distance of at least 25 m to discourage field rodents from infesting the structures following harvest.

Spillage of grain and similar products should always be cleaned up immediately. Stored grain and animal foodstuffs should be kept in rodent-proof containers. If this is not possible, as in bagged storage, then the stacks of food should be kept small, with a clear passage left around the outside of each stack to provide easy access if a rodenticide treatment should be required. Places where livestock are kept and fed should be maintained as clean and tidy as possible. Animal feeds spilled during feeding should be gathered up immediately and either discarded or mixed with the fresh feeds for the next day.

On arable land, it is advisable to eliminate cover by clearing nearby uncultivated areas of weeds, bush or scrub, including field edge habitats and the banks of ditches and other water courses. Field edge habitats for rodents may also be eliminated by consolidating small fields into larger cultivated tracts. Efficient weed control during the growing season discourages the development of rodent infestation, as does prompt and efficient harvesting. In the post-harvest period, it is important to eliminate crop trash, for example, by burning, and to plough the field as soon as possible in order to disrupt any residual food supply that is left in the field.

For example, farmers should practice weed and grass control on the bunds and in the fields of wheat, rice and groundnut to eliminate or reduce the food and cover these plants normally provide to rodents. Both the lesser bandicoot rat and the short- tailed mole rat feed on the roots, tubers and rhizomes of grasses and weeds growing on bunds. The rhizomes of *Sorghum halepense*, (Johnson's grass) and *Desmostachya bipinnata* are subsistence foods of both species of rats year round and especially during the inter-crop periods. Elimination of these from bunds and field interiors would help to reduce the rodent populations infesting rice, wheat and groundnut fields.

B. Wild Boar Damage Reduction

One cultural practice that would help to reduce cover and resting places for wild boar in sugarcane fields would be to break up the large fields of cane as presently planted and reduce the largest blocks into those no larger than one-quarter to one- half acre. Or alternatively, plant cane in strips no wider than about 25 m. The reasons being that wild boars prefer to hide, rest and breed in the larger tracts of sugarcane because here they are best protected from harassment by dogs and humans. If the blocks were made much smaller, especially if there were open lanes or passages between blocks which could be easily patrolled, the wild boar would find it difficult to use such fields.

Another method to use in wild boar damage reduction, would be to plant the cane varieties in synchrony, i.e., soft-rind varieties all planted at the same time so that they ripen together, and harder-rind varieties all planted in synchrony. As now happens, the soft-rind fields are attacked first and individually because their sugar content tends to rise early and they are selectively damaged.

C. Bird Damage Reduction

Several cultural practices for reducing losses due to birds apply to nearly all crops. If possible, avoid planting vulnerable crops near breeding, roosting, and loafing cover preferred by the species causing damage. If impractical to avoid planting adjacent to such preferred habitats, timing plantings so that the sprouting and ripening periods are in synchrony with other plantings in the locality lessens the vulnerability of that planting to birds. Crops that sprout or ripen before others in an area are more susceptible to heavy damage from assemblages of local breeding birds; crops that ripen very late are often severely damaged by migrating birds. Leaving crop stubble for birds to glean as alternate food sources also lessens damage in unharvested crops. In tilled crop fields, delaying tillage until other vulnerable crops have been harvested provides sources of waste grain and weed seeds that furnish birds with a part of their diet that is not a marketable crop. Finally, harvesting the mature crop as soon as practical lessens damage from birds that prefer the mature crop stage.

If changes in crop phenology, that is, planting or harvest times of the food crop being threatened by birds, can be made, it is perhaps the easiest way to avoid bird problems. Where migratory birds are known to appear regularly at a certain time each year, it should be possible to plant a little earlier in the crop season so that the plants will be large enough to avoid the sprout pulling which would normally occur.

If it is not possible to alter crop phenology, then it may be possible to try crop substitution or diversification, especially in monocultural areas. It may be possible to use a different crop rotation schedule to avoid the use of crops normally damaged by birds. In monocultural areas, sometimes the use of more crop diversity, i.e., the use of several different types of other crops mixed with the predominant crop, will help to reduce bird damage to the main crop.

Site selection often plays a prime role in whether a particular field crop is damaged. Planting sunflower or maize near groves of trees or tree rows around fields often will lead to increased attack on the crop by rose-ringed parakeets. Plant these field crops well away from trees, if possible.

Bird-resistant crop varieties, especially those of sorghum, can be used to reduce damage to this grain crop. Varieties that tend to produce higher levels of tannins appear to be more resistant to bird damage but their palatability may be reduced because of the tannin levels.

The cultural practice most likely to reduce bird damage to sprouting maize is deep planting. Maize seeds planted more than 5 cm deep suffered less bird damage in the USA than shallower

planted seeds and maize planted more than 7.5 cm deep in clay soils in Iowa, USA suffered no losses at all despite some bird species feeding in the same fields on other seeds. What the proper depth should be to prevent damage by the mountain or jungle crow is not known at present.

Provision of alternate bird foods, through practices such as using crop diversity, buffer plantings, and delayed tillage, will help in reducing bird damage. When alternate foods are available, birds will do a good amount of their feeding on these, instead of the more valuable and vulnerable crop. Planting buffer crops in rows on the perimeter of the vulnerable crop is another means of diverting birds from the more valuable food source. Delaying tillage of the harvested fields will leave the seeds and grains from the previous crops as available foods for birds and keep them from damaging the newly planted areas.

Sometimes, damage from migratory birds can be reduced or avoided by planting and harvesting the crop early. In this way, the crop is gathered before the birds arrive. Planting and harvesting early may result in reduced production but this should always be weighed against the losses in yield if the regular planting schedule is followed.

Clean farming can reduce damage to ripening rice by some bird species. Clearing away brushy field borders, used by birds for cover and roosting and loafing areas, does much to reduce damage.

For the most part, changes in agricultural practices could go far in solving the majority of bird-pest problems, nearly always to the benefit of the ecosystem, in that birds could be retained as predators in the system and it would be unnecessary to add poisons aimed at bird control.